

optical waveguide comprising: an input surface that admits light; an output surface distal from the input surface, the output surface having a surface area less than that of the input surface; and a sidewall or sidewalls disposed between the input and output surfaces for effecting total reflection of the light rays received by the input surface.

Takahashi relates to the formation of printing plates. The Examiner is correct that Takahashi teaches several features of the present claims, yet fails to teach a collimated light source, an angle of divergence of less than 10 degrees, and wherein the means for directing light directs the light through the substrate in more than one dose.

The Examiner thus cites Rendulic in an effort to fill these deficiencies of Takahashi. Rendulic teaches a printed circuit board having polymers coated and cured thereon. The examiner is correct that Rendulic teaches the use of a collimated light source with an angle of deviation between 3 and 1.5 degrees.

However, the combination of Takahashi and Rendulic still fails to teach the presently claimed array of tapered optical waveguides positioned between the substrate and the light directing means or light source. Each tapered optical waveguide of the claims comprises an input surface that admits light; an output surface distal from the input surface, the output surface having a surface area less than that of the input surface; and a sidewall or sidewalls disposed between the input and output surfaces for effecting total reflection of the light rays received by the input surface.

The Examiner attempts to fill this void by citing Beeson. Applicants respectfully urge that this is not the case. While Beeson does show optical waveguides and a method for forming such waveguides, this reference *does not* teach or suggest such waveguides in combination with the structures of Takahashi and Rendulic. Takahashi relates to relief printing plates, and Rendulic relates to printed circuit boards. In contrast, Beeson relates to a backlighting apparatus, which is

not within the same field of art as the other cited references. In his latest response, the examiner again attempts to argue that Takahashi and Rendulic should be considered as being in the same field of art as Beeson. The examiner further states that positioning the optical waveguides of Beeson in relation to the substrates as done according to the present invention would have been obvious. Applicants strongly disagree, and urge that the examiner is impermissibly reconstructing the art in light of the present disclosure.

Citing references that merely indicate that isolated elements recited in the claims are known is not a sufficient basis for a conclusion of obviousness; there must be something that suggests the desirability of combining the references in a manner calculated to arrive at the claimed invention. Ex parte Hiyamizu, 10 U.S.P.Q.2d 1393, 1394 (PTO Bd. Pat. Ap. and Int., 1988). Neither Takahashi nor Rendulic discuss to light diffusion, or even mention the words "diffuse" or "diffusion". Applicants submit that the Examiner has failed to show any suggestion or motivation in the art to combine the teachings of Takashashi and Rendulic with the Beeson reference, which exists in a very different field of art. It is therefore respectfully urged that the 35 U.S.C. 103 rejection is improper and should be withdrawn.

The Examiner has again rejected claims 57-63 under 35 U.S.C. 103 over Takahashi et al. in view of Rendulic et al and Beeson et al. Applicants respectfully urge that this ground of rejection is improper.

This embodiment of the presently invention relates to an apparatus for manufacturing a light diffusing structure, comprising a metallic layer formed on a layer of photopolymerizable material which photopolymerizable material is positioned on a transparent or translucent substrate and exposed to a source of collimated or nearly-collimated light first directed through a the transparent or translucent substrate for a period of time sufficient to photopolymerize only a portion of the photopolymerizable material after the unphotopolymerized portion of the photopolymerizable portion has been removed; and

an array of tapered optical waveguides positioned between the substrate and the light source, each tapered optical waveguide comprising:
an input surface that admits light;
an output surface distal from the input surface, the output surface having a surface area less than that of the input surface; and
a sidewall or sidewalls disposed between the input and output surfaces for effecting total reflection of the light rays received by the input surface.

The Examiner is correct that Takahashi teaches several features of the present claims, yet fails to teach a light source which generates light having a divergence angle of less than ten degrees, and wherein the light source generates light in more than one dose.

The Examiner thus cites Rendulic in an effort to fill these deficiencies of Takahashi. The examiner is correct that Rendulic teaches the use of a collimated light source with an angle of deviation between 3 and 1.5 degrees.

However, as stated above, the combination of Takahashi and Rendulic still fails to teach the presently claimed array of tapered optical waveguides positioned between the substrate and the light directing means or light source.

The Examiner attempts to fill this void by citing Beeson. Applicants respectfully urge that this is incorrect. As stated above, while Beeson does show optical waveguides and a method for forming such waveguides, this reference *does not* teach or suggest such waveguides in combination with the structures of Takahashi and Rendulic. Neither Takahashi nor Rendulic discuss to light diffusion, or even mention the words "diffuse" or "diffusion". Takahashi relates to relief printing plates, and Rendulic relates to printed circuit boards. In contrast, Beeson relates to a backlighting apparatus, which is not within the same field of art as the other cited references.

It is urged that there is no teaching or suggestion in the art which would motivate one skilled in the art to combine the teachings of Takahashi and Rendulic with the Beeson reference. Thus, it is submitted that the 35 U.S.C. 103 rejection is improper and should be withdrawn.

The Examiner now rejects claim 67 under 35 U.S.C. 103 over Takahashi et al. in view of Rendulic et al. and Beeson et al. in further view of Jarsen. The arguments over Takahashi et al., Rendulic et al., and Beeson et al. are repeated from above and apply equally here.

The examiner cites Jarsen in an effort to fill the voids of the previously cited art. In particular the examiner states that the combination of Takahashi, Rendulic, and Beeson fails to teach a surface having smooth bumps ranging from about 1 micron to about 20 microns in both height and width. The examiner takes the position that since Jarsen teaches a mold for creating bumps on a resin surface prior to curing, that it would have been obvious for one skilled in the art to do so. Applicants respectfully urge that this is not the case.

There is no motivation in the art which would inspire one to combine Jarsen with the previously cited references in the first place. It is urged that the subject matter of Jarsen *does not apply to the technical field of this invention*. Jarsen relates to a matrix used to prepare a mold of elastomeric material, for forming articles such as the information layer of a video disc. In contrast, the present invention relates to light diffusing structures including tapered optical waveguides, for use as a component of an LCD display system.

Furthermore, the bumps described according to Jarsen, which are "information bumps" on a surface of a video disc, are described as having a size which is 0.7 μ m in height and 1 μ m in width. This actually *teaches away* from the present invention which requires 1-20 microns in both height and width. The examiner states that it would have been obvious for one skilled in the art to modify Jarsen to change the size and depth to those ranges of the present claims. However, it is urged that an invention cannot be deemed unpatentable merely because, in a

hindsight attempt to reconstruct the invention, one can find elements of it in the art; it must be shown that the invention as a whole was obvious at the time the invention was made without knowledge of the claimed invention. 35 U.S.C. 103. The Examiner appears to be going to great lengths to locate and try to interrelate references involving separate features of the present invention, but no matter how one applies or combines these references they do not disclose the presently claimed invention or its attained the demonstrated benefits. When selective combination of prior art references is needed to make an invention seem obvious, there must be something in the art to suggest that particular combination other than hindsight gleaned from the invention itself, something to suggest the desirability of the combination. Uniroyal, Inc. v. Rudkin-Wiley Corp., 5 U.S.P.Q.2d 1434, 1438 (CAFC 1988). Such a suggestion is absent in the cited references.

It is urged that one skilled in the art would not have been inspired to combine the teachings of Jarsen with those of the previously cited references in an effort to formulate the presently claimed invention. Thus, it is respectfully urged that the 35 U.S.C. 103 rejection be withdrawn.

The Examiner has rejected claim 64 under 35 U.S.C. 103 over Takahashi et al. in view of Rendulic et al. and Jarsen. This embodiment of the present invention relates to a mold for manufacturing a light diffusing structure, comprising a metallic layer formed on a layer of a photopolymerizable material, comprising at least one photopolymerizable monomer or oligomer, and a photoinhibitor, exposed to a source of collimated or nearly-collimated light first directed through a transparent or translucent substrate, the substrate being fabricated from a material from one or more of the classes of (a) amorphous materials; (b) semi-crystalline materials that contain crystalline domains interspersed in an amorphous matrix; and (c) purely crystalline materials, for a period of time sufficient to photopolymerize only a portion of the photopolymerizable material after the unphotopolymerized portion of the photopolymerizable portion has been removed.

The Examiner states that Takahashi teaches each aspect of claim 64 except for the collimated

light source and metal layer. Thus, the Examiner again combines Rendulic with Takahashi to fill this void. Still, this combination still fails to teach or suggest the presence of smooth bumps ranging in size from 1-20 microns. The examiner thus cites Jarsen to provide this feature. It is respectfully urged that the arguments over Jarsen are repeated from above and apply equally here. It is urged that one skilled in the art would not have been inspired to combine the readings of Jarsen with Rendulic and Takahashi in an effort to formulate the presently claimed invention. Thus, it is respectfully asserted that the 35 U.S.C. 103 rejection should be withdrawn.

The Examiner has rejected claims 22-30, 35, 36 and 42 under 35 U.S.C. 103 over Matsumura et al. in view of Rendulic et al and Beeson et al. Applicants respectfully submit that this ground of rejection not correct.

Matsumura relates to a process for producing a multicolor display. The Examiner is correct that Matsumura teaches several features of the present claims, yet fails to teach a collimated light source, an angle of divergence of less than 10 degrees, providing light in more than one dose, and an array of optical waveguides with lenticular elements juxtaposed with polymerizable materials.

The Examiner thus cites Rendulic in an effort to fill the deficiencies of Takahashi. The examiner is correct that Rendulic teaches the use of a collimated light source with an angle of deviation between 3 and 1.5 degrees. However, it is urged that one skilled in the art would not combine Rendulic, which relates to printed circuit boards, with Matsumura, which relates to multicolor displays. These cited references are in different fields of art, and it is submitted that there is no teaching or suggestion in either of these references which would lead one skilled in the art to combine Matsumura and Rendulic in an effort to devise presently claimed invention.

Furthermore, a combination of Matsumura and Rendulic would still fail to teach the presently claimed array of tapered optical waveguides positioned between the substrate and the light

directing means or light source. Each tapered optical waveguide comprises an input surface that admits light; an output surface distal from the input surface, the output surface having a surface area less than that of the input surface; and a sidewall or sidewalls disposed between the input and output surfaces for effecting total reflection of the light rays received by the input surface.

The Examiner attempts to fill this void by citing Beeson. As stated above, it is respectfully urged that this is not the case. While Beeson does show optical waveguides and a method for forming such waveguides, this reference *does not* teach or suggest such waveguides *in combination with the structures of Matsumura and Rendulic*.

Citing references that merely indicate that isolated elements recited in the claims are known is not a sufficient basis for a conclusion of obviousness; there must be something that suggests the desirability of combining the references in a manner calculated to arrive at the claimed invention. Ex parte Hiyamizu, 10 U.S.P.Q.2d 1393, 1394 (PTO Bd. Pat. Ap. and Int., 1988). Neither Applicants submit that the Examiner has failed to show any suggestion or motivation in the art to combine the teachings of Matsumura and Rendulic with the Beeson reference. Applicants therefore submit that the present invention is not made obvious by the combination of Matsumura et al., Rendulic et al., and Beeson et al., and the 35 U.S.C. 103 rejection should be withdrawn.

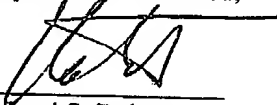
The Examiner has rejected claim 66 under 35 U.S.C. 103 over Matsumura et al. in view of Rendulic et al. and Beeson et al., and in further view of Jarsen. This embodiment of the invention relates to the apparatus of claim 42, wherein said photopolymerized portion has a surface having smooth bumps ranging from about 1 micron to about 20 microns in both height and width.

The arguments over Matsumura et al., Rendulic et al., Beeson, and Jarsen are repeated from above and apply equally here. It is therefore respectfully urged that the 35 U.S.C. 103 rejection is improper and should be withdrawn.

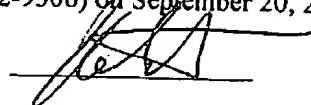
The Examiner has rejected claims 31-33, 37-41, 65 under 35 U.S.C. 103 over Matsumura et al. in view of Rendulic et al. and in further view of Jarsen and Beeson et al. Applicants respectfully urge that this ground of rejection is improper. The arguments against Matsumura, Rendulic, Jarsen, and Beeson are repeated from above. It is therefore respectfully urged that the 35 U.S.C. 103 rejection is improper and should be withdrawn.

The undersigned respectfully requests re-examination of this application and believes it is now in condition for allowance. Such action is requested. If the Examiner believes there is any matter which prevents allowance of the present application, it is requested that the undersigned be contacted to arrange for an interview which may expedite prosecution.

Respectfully submitted,


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I hereby certify that this paper is being facsimile transmitted to the United States Patent and Trademark Office (FAX No. 703-872-9306) on September 20, 2004.


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